The shot-hole borer in the Tijuana River Valley -- a new non-native, invasive pest

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shot-hole borer – new to S. Cal.

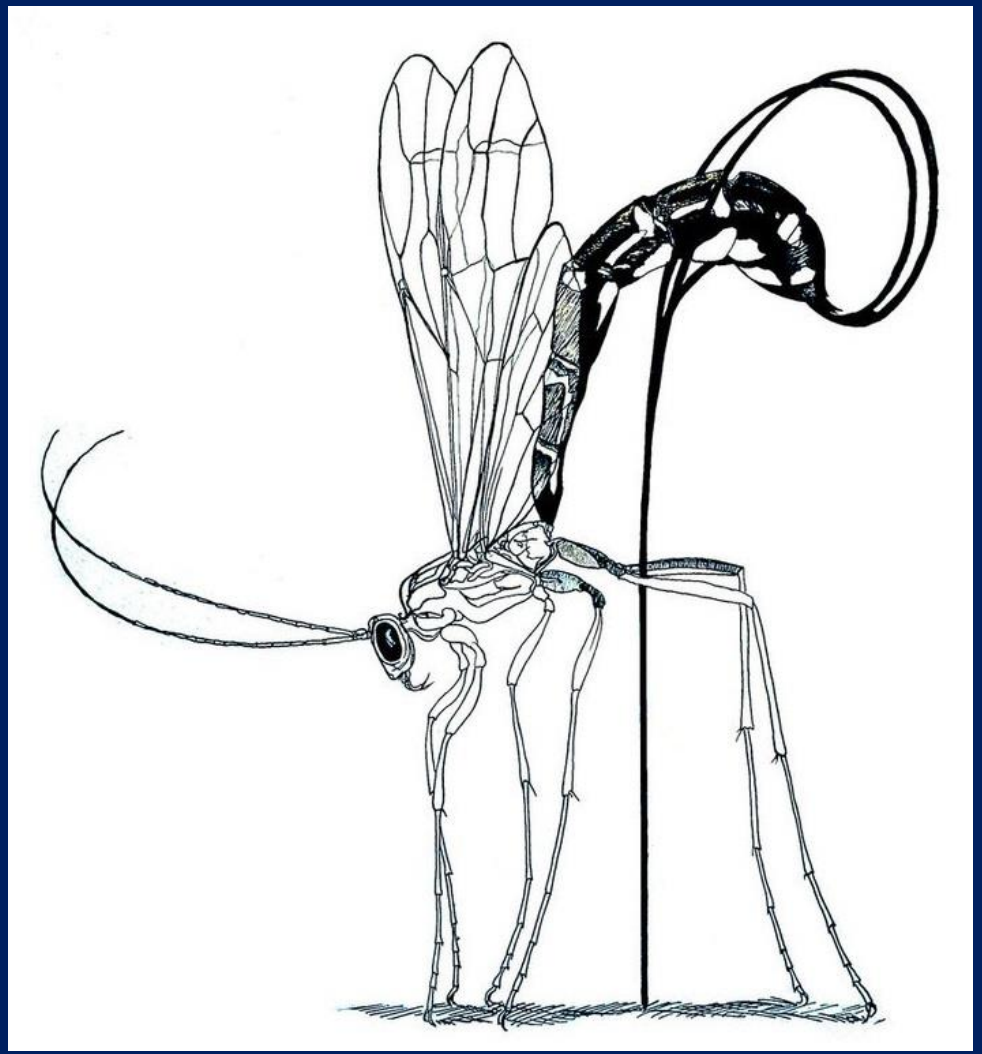
It kills trees with its tunneling + associated fungus

It kills avocado trees

- A serious threat to the avocado industry
- Dr. Eskalen, a plant pathologist at UC Riverside, has a group that is studying the beetle
- Their goal is to protect the avocado orchards
- Web = eskalenlab.ucr.edu
  Email = eskalenlab@gmail.com

How to protect avocados?

- Insecticide? No
- Fungicide? No
- Trapping? No
- Bio-control?
  Working on it.



Beetle first observed in Tijuana River Valley in 2015

Summer 2015

today

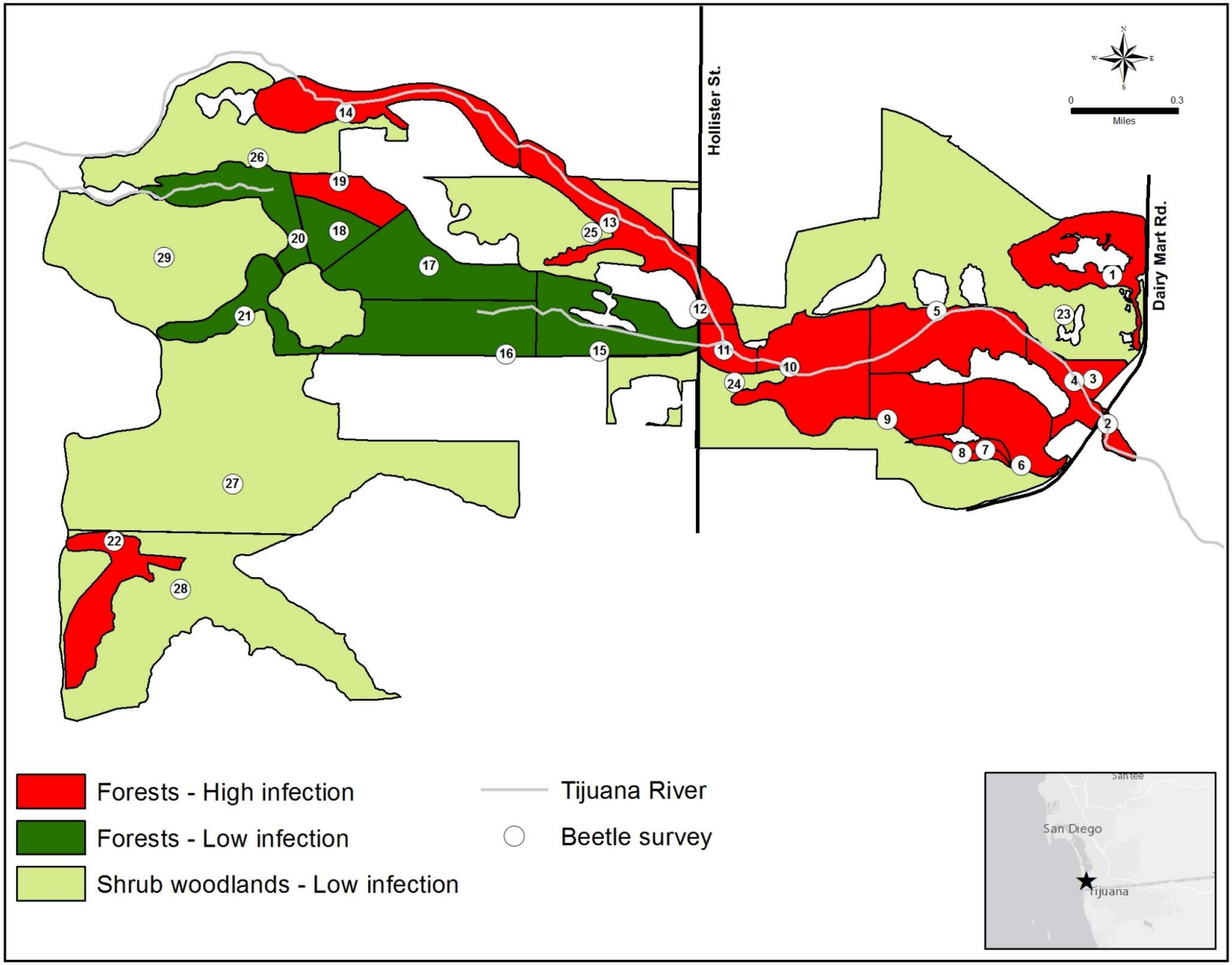
My studies

- I’ve been studying the plants in the valley for more than 10 years

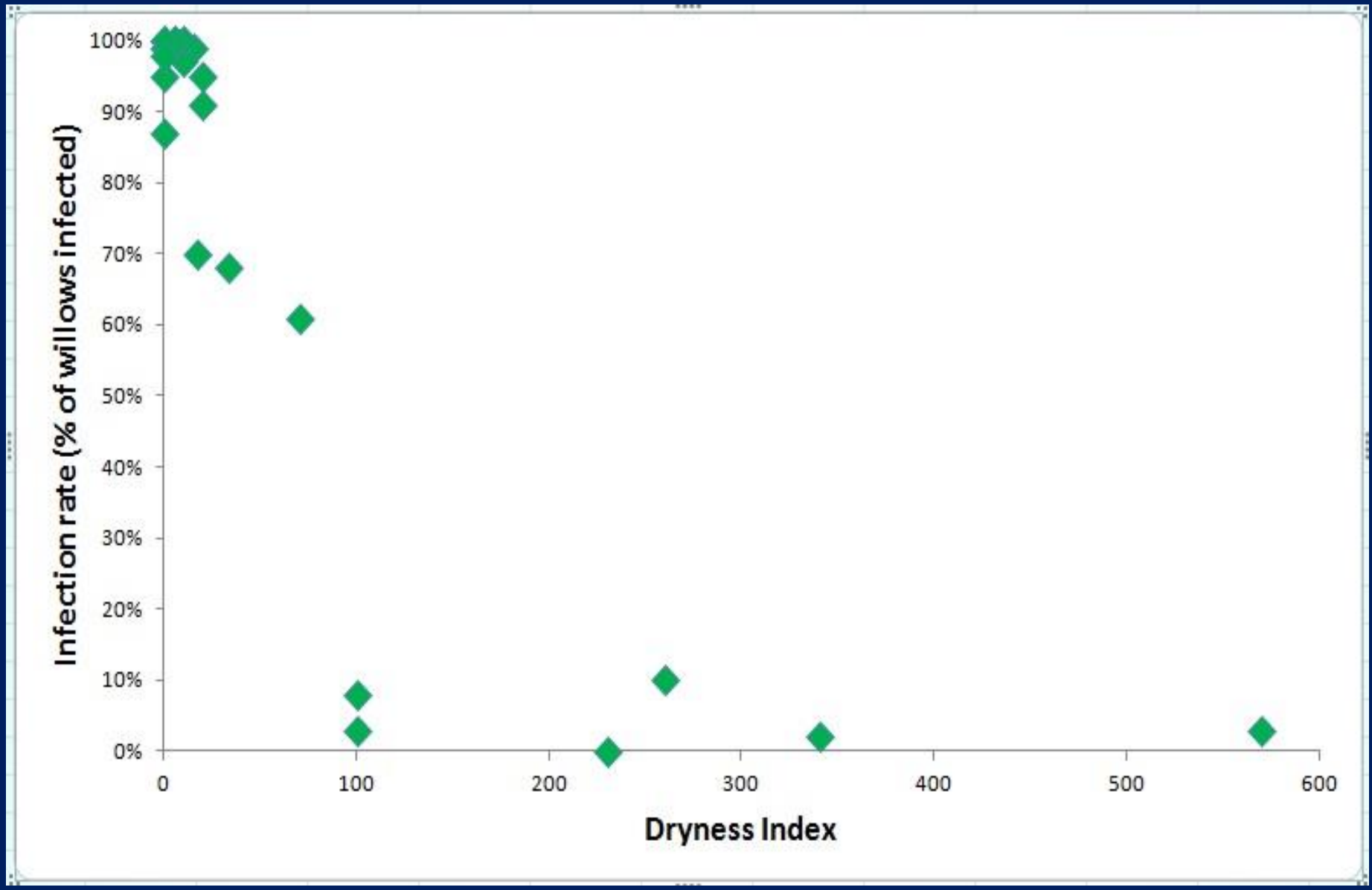
- Nothing like this has ever happened before

- I’ve been studying the beetle’s impact on the natural forests in the Valley since October 2015
    - extent of the infection
    - magnitude of the damage
    - which species most affected

1. Beetle infection



Infection rate vs dryness



Wet vs dry units

wet vs dry (anecdote)

Wet vs dry

- I found this beetle prefers trees that are well watered
- I suggest that when looking for more infected plants – look in native willow trees near water
- I suggest that avocado growers not over-water

2. Extent of tree damage

trees damaged

- ~140,000 willow trees
  have already been infected and suffered major damage

- The fallen branches pose an important flood risk

3. Infection rate of the common species in the valley

NATIVE SPECIES	
Arroyo willow	82%
Black willow	74%
Red willow	64%
Western cottonwood	53%
California sycamore	21%
Mule fat	16%
Coyote brush	5%
singlewhorl burrobrush	3%
Narrow-leaf willow	1%
Laurel sumac	0%
bladderpod	0%
Blue elderberry	0%
Tarragon	0%
Coastal goldenbush	0%

NON-NATIVE SPECIES	
Brazilian pepper	47%
Tree tobacco	20%
Castor bean	13%
Gum tree	10%
Salt cedar	3%
Peruvian pepper	0%
Myoporum	0%
Cyclops wattle	0%
Giant reed	0%

Probable shift in the dominant plants in the wet forests from native forest trees to non-native, non-tree species

This shift will be very important for all the species in the valley, in particular the Least Bell's Vireo

SUMMARY OF MY 2015-16 RESULTS

- The beetle/fungus infection is widespread in the TJ Valley
- The infection is correlated with dryness/wetness
- The damage to willows has been extensive, massive and quick
- There is likely to be a significant shift in the vegetation in the wet forests

Next steps

1) Further spread of the beetle?

2) What happens to the damaged forests?

3) How to best restore a damaged forest?

Best Management Practices - Spread

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Best management practices for TJ Valley

- Those who work in the TJ Valley forests should do all they can to prevent spreading the beetle to uninfected areas outside the valley
  - avoid moving wood or chipped material from the valley
  - clean wood fragments off all vehicles, equipment and tools before leaving the valley

- We should inform: TJ Valley landowners, City of San Diego, CA Conservation Corps, Urban Corps and others who may be unintentionally spreading the beetle

QUESTIONS?